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CIRCULATION
OF THE
LOBAR GANGLIA

H. F. AITKEN

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A REPORT

ON THE

CIRCULATION OF THE LOBAR GANGLIA

BY

H. F. AITKEN

MADE TO DR. JAMES B. AYER

The Fort Hill Press
BOSTON, MASS.
1909

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A REPORT ON THE CIRCULATION OF THE LOBAR GANGLIA. MADE TO DR. JAMES B. AYER.

IT is a matter of importance that the anatomy of the circulation of the danger spot of the brain should be thoroughly understood. Owing to the barren description given in the text-books, Mr. H. F. Aitken, artist at Massachusetts General Hospital, has, with the facilities of the Massachusetts General Hospital Pathological Laboratory, made fresh dissections and drawings of the region.

In 1874, H. Duret, a pupil in the Salpêtrière, did the anatomical work for Charcot and has been referred to since that time by all anatomists as authority upon cerebral circulation.

He stated in *Recherches Anatomiques sur la Circulation de l'Encéphale* (*Archives de Physiologie Normale et Pathologique*, 1874, p. 60): " We have often noted the insufficiency of the actual knowledge of cerebral circulation of certain lesions of the brain, particularly of hemorrhage and softening. . . . The anatomists who have gone before us have been content to describe the origin and distribution of the brain in a general manner, . . . and they have not been able to foresee the interest which the detailed study of the vascularization of the organs of the brain, of the striate body, of the optic thalamus, of the circumvolutions, and of the two substances will have."

It would be difficult to find greater encouragement for this work.

It is the clinical anatomy connected with old age which is the incentive of our study.

The apt-to-be-neglected care of the old is the proper study and specialty, so to speak, of the practitioner. One feels that it is imperative to understand numbness, fatigue, tremors, all degrees of unconsciousness, and all forms of cerebral softening, if one adds cerebral arteriosclerosis to the study of old-age conditions, understanding that in many cases old age is renal, cardiac, cerebral, arteriosclerosis.

We must build up on the " detailed study " of the cerebral anatomy, as Duret has said, in order to understand old age, using this knowledge as the foundation before studying the physiology of the circulation, or of the pathology or of the walls of the vessels.

Mr. Aitken's report follows:

Dr. Ayer, —[1]The system of the circulation of the lobar ganglia as taught to-day is the description presented by M. Duret in 1872, 1873, and 1874, and it apparently has never been corroborated by any investigator since.

In 1872, Dr. Heubner, of the University of Leipzig, published a short account which M. Charcot [2] wrongly stated was in all essential points identical with M. Duret's.

Dr. Heubner's findings will be indorsed in the present report, which is at variance with M. Duret's,[3] a condensation of which follows.

[4] The base of the a. cerebri anterior gives off branches to the nucleus caudatus. *These branches are not constant, for the nucleus caudatus may receive arterial blood from the ventricular arteries* and also from the a. cerebri media. They are distributed in two ways. Springing from the *origin* of the a. cerebri anterior they *almost immediately* penetrate the brain within the trygonum olfactorium and perforate the vault of the corpus callosum and go into the head of the nucleus caudatus. They divide into five or six branches *which are nearly subependymal; they do not go beyond the first 2 cm. of the nucleus caudatus.* In other cases one sees the a. cerebri anterior give *origin to one or two arterioles which pursue a long retrograde course from 3 to 4 cm. in order to reach the most internal part of the substantia perforata anterior, and they supply exclusively the nucleus caudatus.*

Often the a. cerebri anterior gives no branches to the nucleus caudatus.

The a. cerebri media from 1 to 1½ cm. from its origin gives out from its upper border the arteries of the corpus striatum. The external are voluminous, the internal ones smaller; among the first there is one which skirts along the base of the putamen near the surface in order to reach the nucleus caudatus, where it divides into four or five terminal branches. *It is this artery which,* after our studies at the Salpêtrière, and after the teachings of M. Charcot, we designate as *the seat of hemorrhages of the corpus striatum.*

This arteriole furnishes many collateral branches to the putamen. There are also two or three external branches. Some are carried forward in the putamen and often reach the ends of the nucleus caudatus. One can class this group of arteries under the name of the "lenticulo-striate arteries." Others come behind at the posterior end of the putamen *and end in the thalamus and are classed as " lenticulo-optic arteries."*

The internal arteries coming to the point of the globus pallidus are " lenticular arteries.'' It is necessary, also, to understand in the groups of internal arterioles the branches furnished to the nucleus caudatus by the a. cerebri anterior *when they exist.*

The lenticulo-optic arteries arising from the a. cerebri media direct themselves backward and traverse the putamen, *then the capsula interna, and distribute themselves at the anterior part of the thalamus.*

---

[1] Part of the findings given in this report were printed in the *Boston Medical and Surgical Journal,* June 13, 1907, and *all* of the important findings were communicated by Dr. James B. Ayer to the Boston Society of Psychiatry and Neurology on January 22, 1909, and many of our findings have been corroborated by the late Dr. C. E. Beevor. See "Textbook of Nervous Diseases and Psychiatry," Charles L. Dana, M.D., etc. Seventh edition, 1908, pp. 405-6.

[2] In Localisation of Cerebral and Spinal Disease. New Sydenham Society, London, 1883.

[3] H. Duret: Recherches Anatomiques sur la Circulation de l'Encéphale. Archives de Physiologie Normale et Pathologique, bl., 1874, p. 70.

[4] The portions of M. Duret's description which are unconfirmed in this report are printed in italics.

Dr. Heubner's report,[5] condensed, is as follows:

From the basal region proceed numerous small arteries, 1½ to ½ mm. in diameter, from the main branches, and sink themselves, after a short course ½ to 1½ cm. long, into their proper districts.

These vessels have no anastomoses with each other, but they are genuine end-arteries, in Cohnheim's sense. From the base of the a. cerebri anterior, which lies between the a. cerebri media and the a. communicans anterior, there proceeds quite near the latter *constantly* a small artery which provides blood to the head of the corpus striatum.

From the first centimeter of the a. cerebri media there go little vessels which care for the front leg of the capsula interna and the globus pallidus.[6]

From the first 2 cm. of the a. cerebri media proceed those little arteries which care for the putamen and the middle part of the nucleus caudatus and the capsula externa.

From the a. communicans posterior there is an artery to the front of the thalamus.

The a. chorioidea supplies the posterior leg of the capsula interna and the front part of the thalamus.

From the first 2 cm. of the a. cerebri posterior go those little vessels which care for the back half of the thalamus.

---

[5] The Topography of the Nutritive Area of the Single Brain Arteries. In the Centralblatt für die Medizinischen Wissenschaften, Leipzig, December 7, 1872, pp. 817–821.

[6] These vessels from the base of the a. cerebri anterior to the globus pallidus I have found to be a variation, occurring in less than 10% of the brains dissected, while one was found in 90% of the dissections to originate from the base of the a. cerebri anterior.

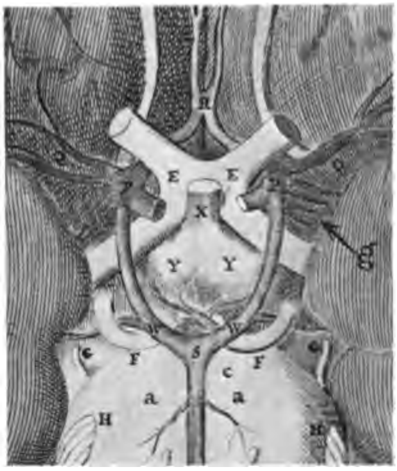
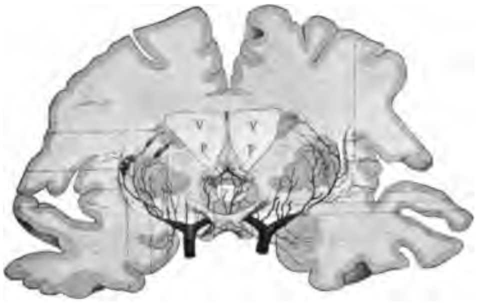
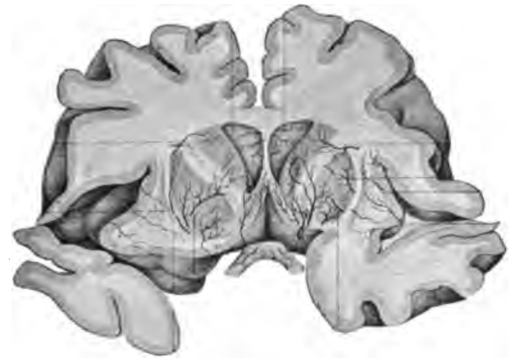


Fig. 1.

Shows an early illustration of the circle of Willis (Willis Opera, Amsterdam, 1682). It is probably safe to say that Willis was the first to picture even so much of these arteries to the lobar ganglia which are shown (point *g*) arising on the a. carotis interna between the origins of the a. cerebri media and a. communicans posterior.



No. 1.



No. 2.

FIG. 2. M. Duret's original illustration.

No. 1. This cut does not follow his text (there are luxuriant branches from the a. cerebri anterior to the thalamus); one branch is shown from the a. cerebri anterior to the globus pallidus that he nowhere mentions (although I have found it to be constant); and it is no doubt placed in the drawing through the same carelessness that the artist, M. Claivault, has shown throughout — such as the main and outer branch (Charcot's?) sending smaller branches directly through the capsula externa into and sometimes through the claustrum and even into the cortex of the insula, and branches from the a. cerebri media and a. carotis interna to the nucleus amygdalæ.

No. 2. Supposed to show the continuation of some of the branches of Fig. 1, turns the perplexity of that plate to confusion. It is astonishing that M. Duret should have published these plates.

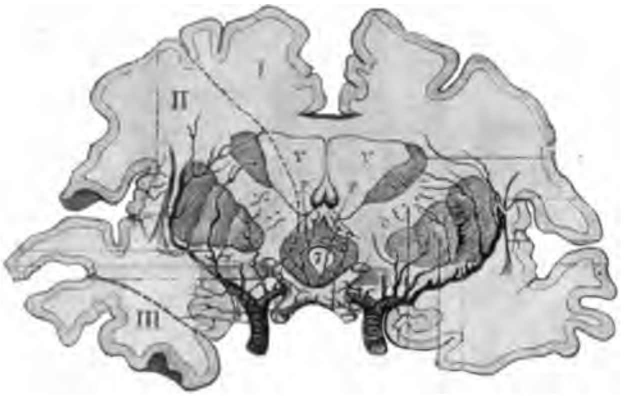


Fig. 3.

Fig. 1 of M. Duret was copied with the caliber of Charcot's artery greatly exaggerated and used by M. Charcot to illustrate his articles. This plate was adopted by many contemporary anatomists and has been used by later ones.

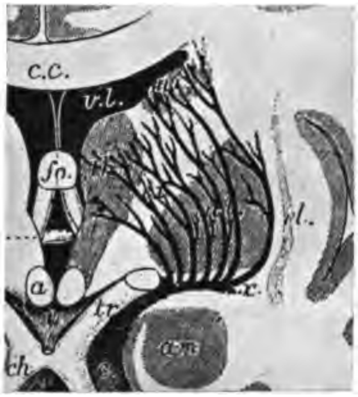


Fig. 4.

The most popular picture to-day showing the circulation of this region; it has been developed, without investigation, from the text and ill-advised drawing of 1874.

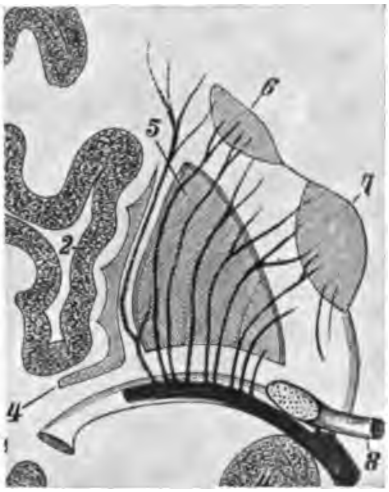


Fig. 5.

This cut is from a late book (1907) showing further progress of the original errors, with the so-called Charcot's artery practically in the capsula externa for its entire length and arriving ultimately nowhere, and suggesting the trend of the pictorial future of this region if allowed to develop along the lines of credence.

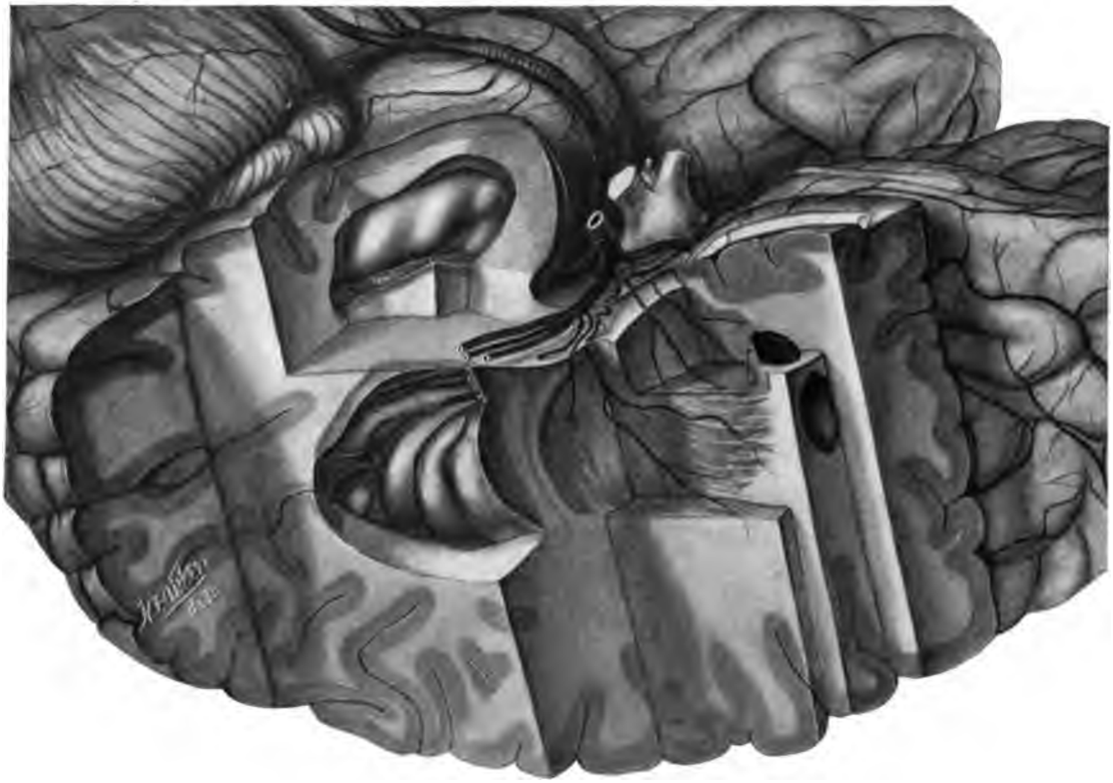


Fig. 6.

Shows the general situation of the lobar ganglia and relation to the insula, hippocampus, chiasma opticum, cornu ventricular lateralis, etc. Also, view of Heubner's system from the a. cerebri anterior.

As all dissections and drawings of brains were made with their lower surfaces upward, it was considered consistent to publish them in that position

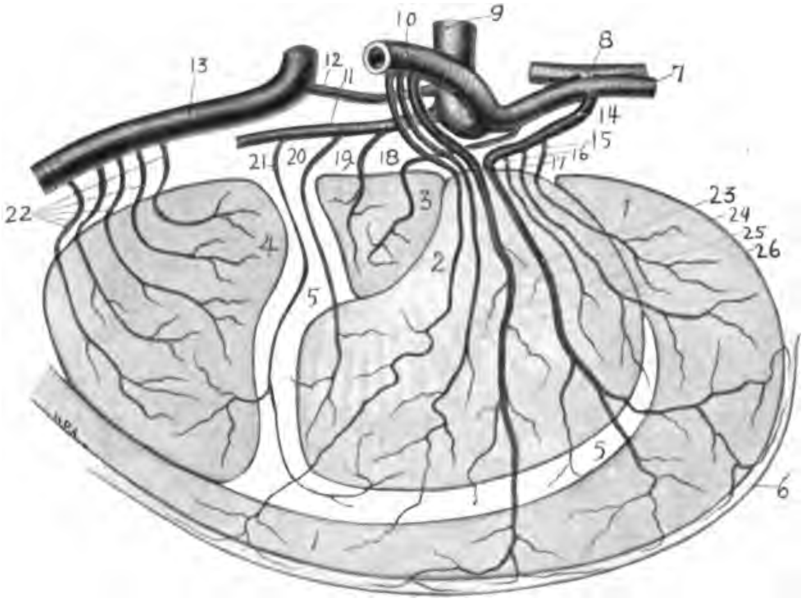


Fig. 7.

Shows the general scheme of the circulation of the left lobar ganglia.

No. 1 is the nucleus caudatus; 2, the putamen; 3, the globus pallidus; 4, the thalamus; 5, the capsula interna; 6, the wall of the ventriculi lateralis, all shown diagrammatically. The findings are founded upon the examination of 45 brains. The dissecting was confined mostly to the nucleus lentiformus, nucleus caudatus, capsula interna, and the front part of the thalamus. The circulation of the remoter posterior and inner parts of the thalamus is not given in this report.

The circulation as shown was found in 90% of the dissections, with the exceptions of No. 21 (both forks of this branch were not constant, though one or the other was) and No. 15. If this or any extra branch perforate the brain between the trigonum olfactorium and the fissure longitudinalis, it goes directly into the nucleus caudatus without first traversing the putamen.

No. 14 is the artery referred to in this report as Heubner's artery or system. It was found on both sides of the brain in 100% of the dissections made.

(Heubner states that he found it constantly on both sides of 30 brains.) It gives off from 3 to 10 branches to the lobar ganglia and frequently sends off one or more cortical branches.

The main trunk of this artery, No. 23, supplies the front parts of the putamen, capsula interna, and nucleus caudatus; it is supported in this work by Nos. 15, 16, and 17. No. 18 is a constant branch which supplies the globus pallidus. Nos. 24, 25, and 26 are three branches from the a. cerebri media, supplying the middle and back part of the putamen. While dissecting it was often thought that No. 26 lead into the thalamus, but a cross-cut proved that it was in the cauda nuclei caudati. No. 19 is the first branch from the chorioidea, supplying the globus pallidus. No. 20 is the second branch going to the most posterior part of the putamen and No. 21 is confined mostly to the capsula interna and ending in the putamen or thalamus or both. No. 22 branches from the a. cerebri posterior to the thalamus.

From the bases of the a. cerebri anterior and the a. cerebri media there were at times many small hairlike branches that penetrated the brain for not more than 4 mm. which have not been considered in this report.

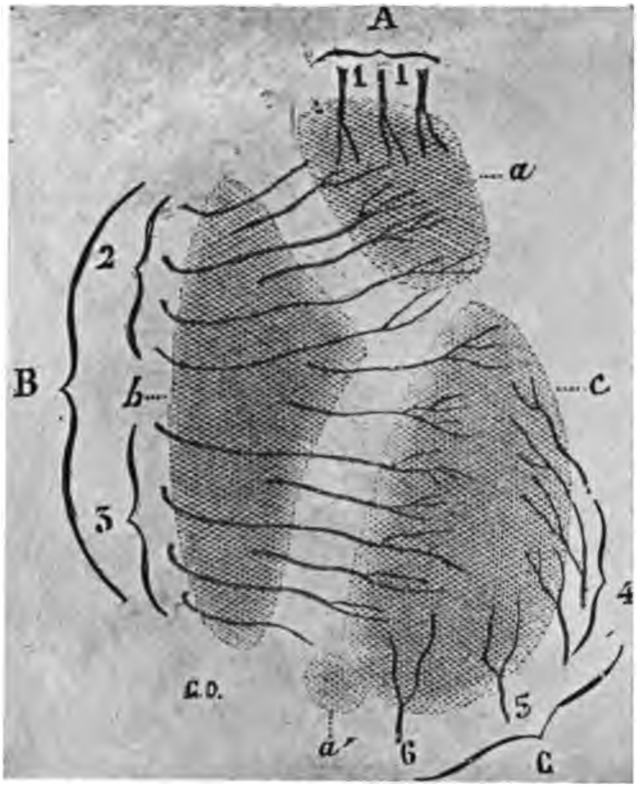


Fig. 8. *A*, Ant. C. *B*, Med. C. *C*, Post. C

Is a well-known diagram of a horizontal section through the lobar ganglia showing three sources of blood supply, with the relative number of branches.

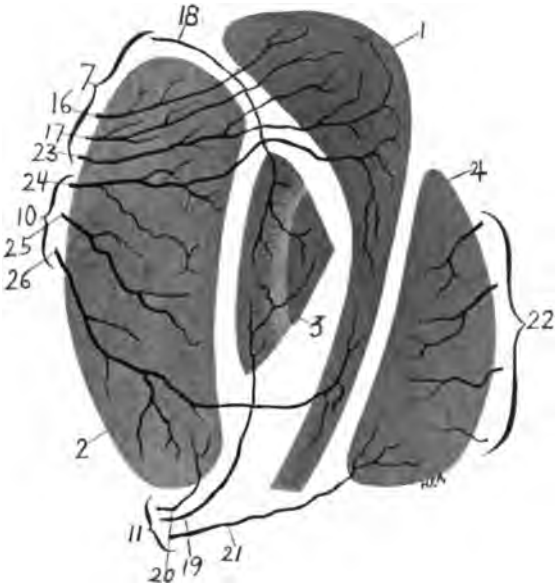


FIG. 9.

Is a similar diagram, which is consistent with the findings in this report. The numbers on this plate correspond with those on Fig. 7.

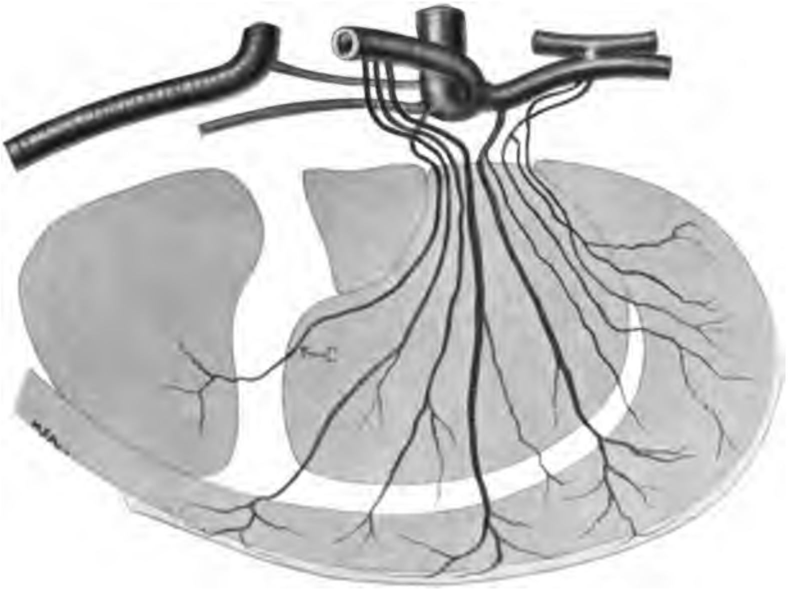


Fig. 10.

Showing that Heubner's artery with its branches, after it has entered the brain, remains unchanged as a system, notwithstanding variations of source. Thus, in the above plate, the main trunk of this system starts from the base of the a. cerebri anterior and not from its usual point of origin, where, in this case, the minor branches originate with two trunks; branch C is an anomaly arising in the a. carotis interna, close to the source of the a. chorioidea, going through the putamen close to the globus pallidus and passing through the capsula interna into the thalamus.

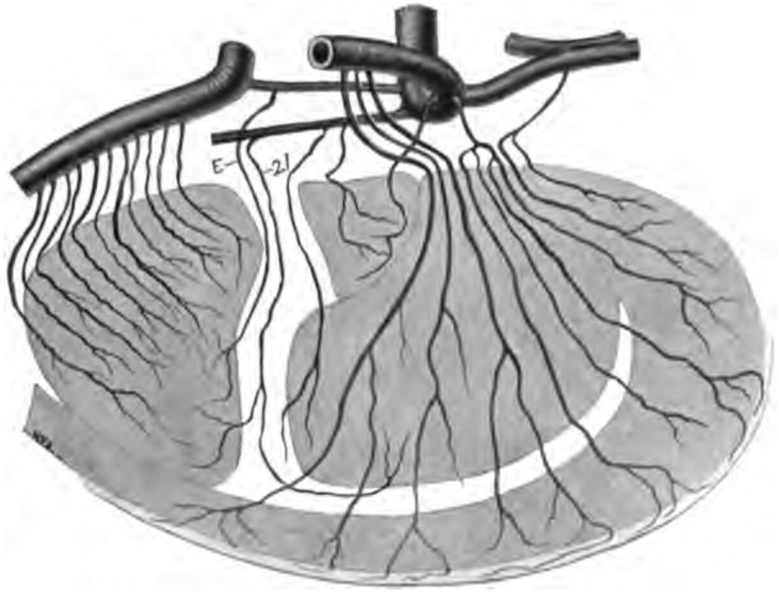


Fig. 11.

Shows another variation of the Heubner system. The source of the main trunk arises at the base of the a. cerebri media; the innermost minor branches arise at the right point; also, the usual branch from the base of the a. cerebri anterior to the globus pallidus arises at the base of the a. cerebri media.

This plate also shows the branch from the a. communicans posterior to the thalamus, which is a frequent occurrence, and an excessive number of branches from the a. cerebri posterior to the thalamus.

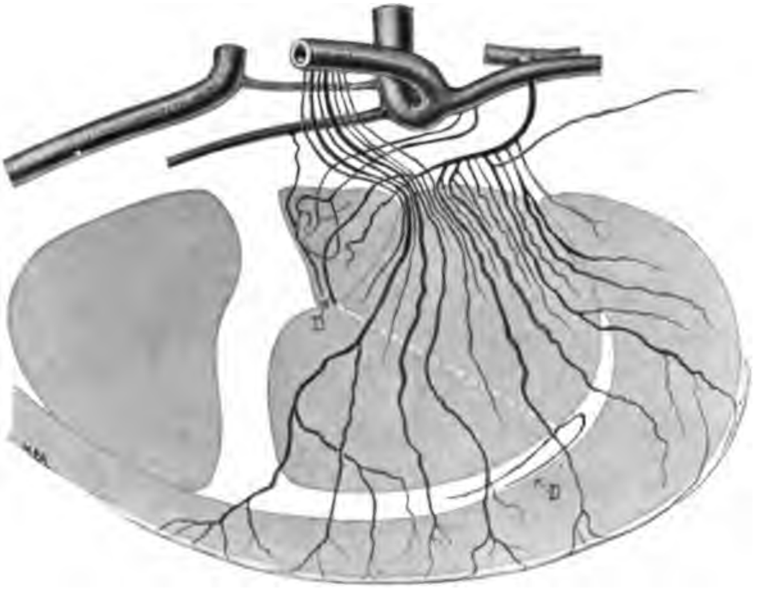


Fig. 12.

Shows an unusual number of branches from the a. cerebri anterior and a. cerebri media. The branches are sent from the base of the a. cerebri anterior to the globus pallidus.

Heubner's system gives out one cortical branch and two branches to the globus pallidus, one of which, D, passes through into the capsula interna, arriving at, without penetrating, the neck of the nucleus caudatus, where it divides and turns sharply, laying its course backward for about 12 mm.

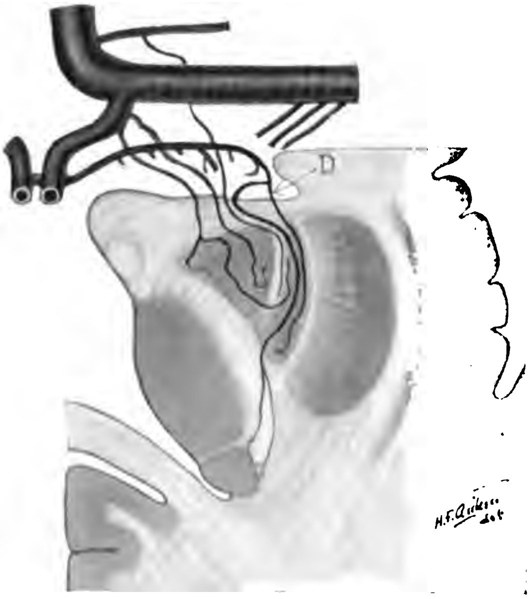


Fig. 13.

Cross section of Fig. 12, showing unusual amount of blood sent to the globus pallidus, and another position of branch D.

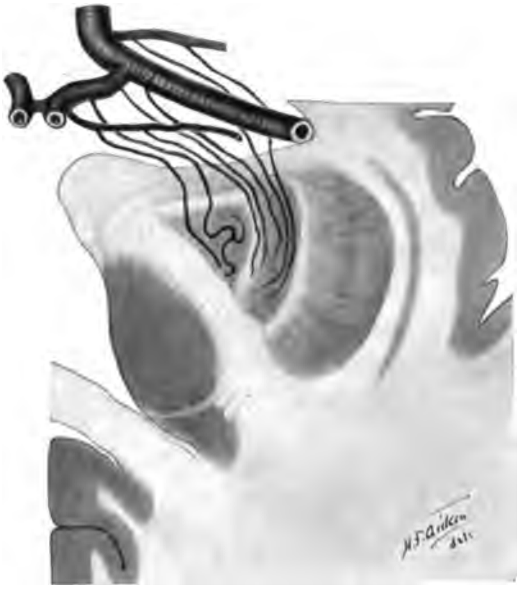


Fig. 14.

Shows an unusual amount of blood sent to the globus pallidus similar to that of Fig. 13. Two branches from Heubner's system; two branches from the base of the a. cerebri anterior; one from the base of the a. cerebri media; and two from the chorioidea.

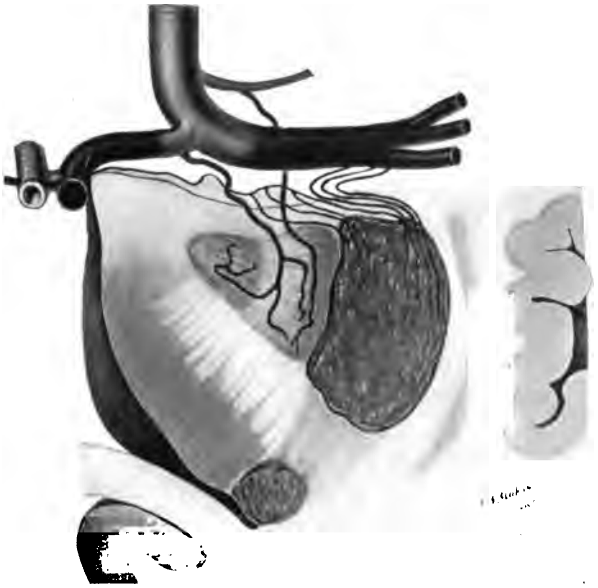


FIG. 15.

In this case a clot of blood was set free during an operation on the neck and it passed up the a. carotis interna. Upon reaching the point of bifurcation which forms the a. cerebri anterior and a. cerebri media, the clot separated and engorged them, leaving only their bases free. Therefore it did not interfere with the circulation of the globus pallidus, while the putamen and nucleus caudatus with part of the capsula interior softened.

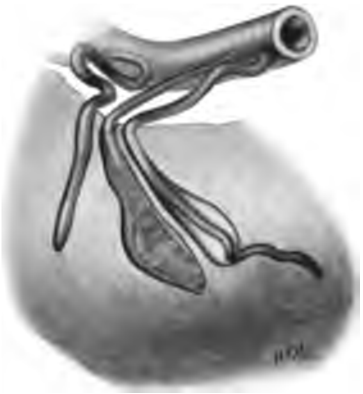


Fig. 16.

The larger vessels, for about 10 to 15 mm. after they enter the brain, lie in a sort of canal (mentioned by Bastian). These canals are broad and flat and are lined with a continuation of the pia mater, which here becomes extremely thin.

In some cases these canals are merged into one.

Similar forms are sometimes found in more remote parts where a vessel suddenly becomes tortuous, or at a point of branching, as with the vein in Fig. 23, point A.

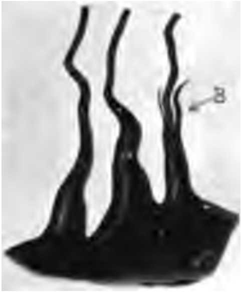


Fig. 17.

Blood clot will work its way into these canals, and in brains hardened by formalin it then resembles aneurism, but on being exposed to the air and becoming dry it will peel off, leaving the vessel intact. See point B.

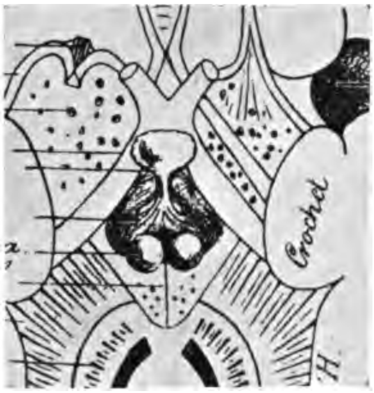


Fig. 18.

The substantia perforata anterior as shown in a late book.

The perforations in this space are shown in an erroneous manner in all anatomies examined, with the usual exception of that of Spalteholz, in which the principal perforations are shown correctly arranged along the anterior border of the space.

The other anatomies show them without arrangement, as above.

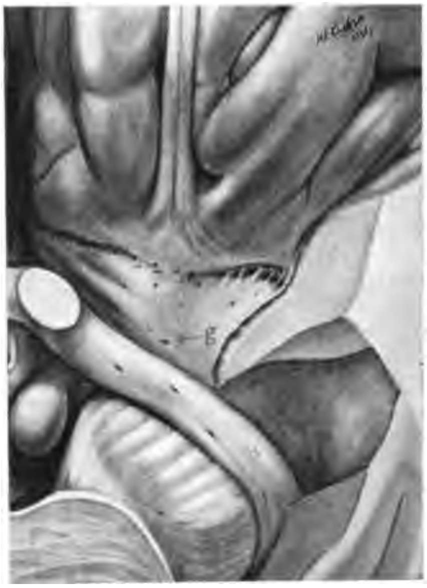


FIG. 19.

The substantia perforata anterior is bound in front by the trigonum olfactorium, the innermost portion of the limen insulæ, and the outermost part of the area parolfactoria; *outwardly* it is bound by the base of the lobus temporalis cerebri; *backwardly*, by the tractus opticus, and *inwardly* it forms into the gyrus subcallosus.

The principal perforations are immediately behind the innermost portion of the limen insulæ.

There are from 6 to 10, from 1 to 1½ mm. in diameter, and they are arranged in an irregular row.

The other perforations are scattering, minute, and unimportant, with the exception of the one at point "*g*," which receives the artery from the a. cerebri anterior supplying the globus pallidus.

The tractus opticus was found, with few exceptions, with perforations to receive the three branches of the a. chorioidea.

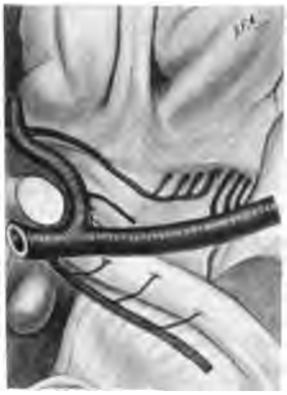


FIG. 20.

Shows the general scheme of distribution of the arteries to the perforations.

Sometimes the branches of the a. chorioidea do not penetrate the tractus opticus, but wrap around either behind or in front of it.

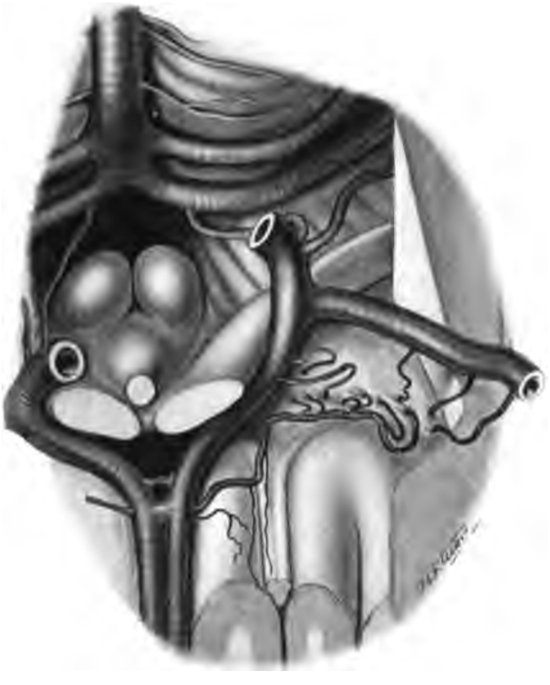


FIG. 21.

A. carotis interna pulled back, showing variations of distribution of branches to the perforations, and showing an extra branch from the base of the a. cerebri anterior and two cortical branches from Heubner's artery.

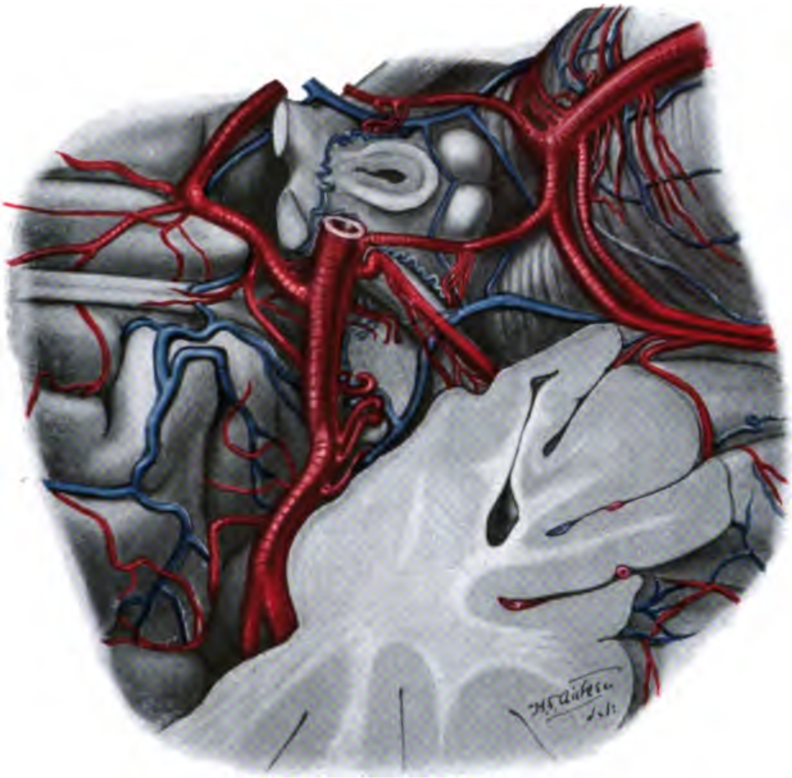


Fig. 22.

Showing part of circulation at the base of the brain practically undisturbed; the pia mater is omitted and a portion of the lobus temporalis is removed.

Shows the venuous circle similar to Willis'.

Heubner's artery is shown giving cortical branch to the inferior surface of the tractus olfactorius.

The cerebri anterior sends from its base three branches to the globus pallidus.

The branches from the a. chorioidea do not in this case perforate the tractus opticus.

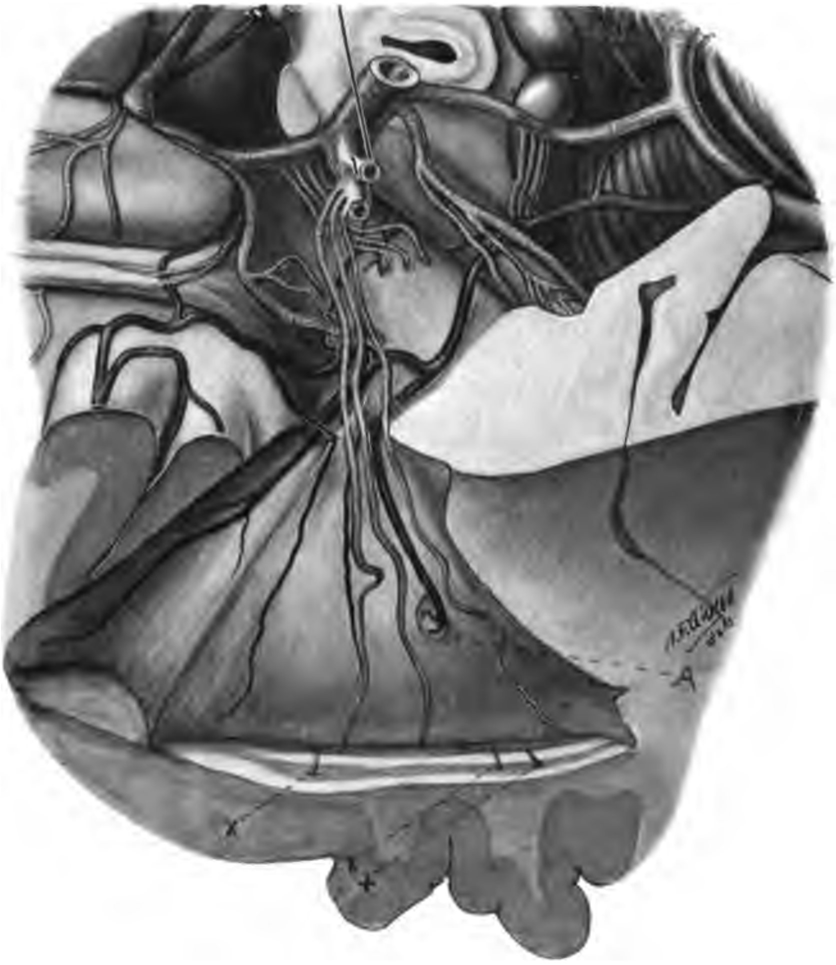


Fig. 23.

A further dissection of Fig. 22, showing part of venous circulation of the putamen and nucleus caudatus. *x x x* are branches from the a. cerebri media to the claustrum, thrown off from the a. cerebri media at a point about 3 cm. from the a. carotis interna.

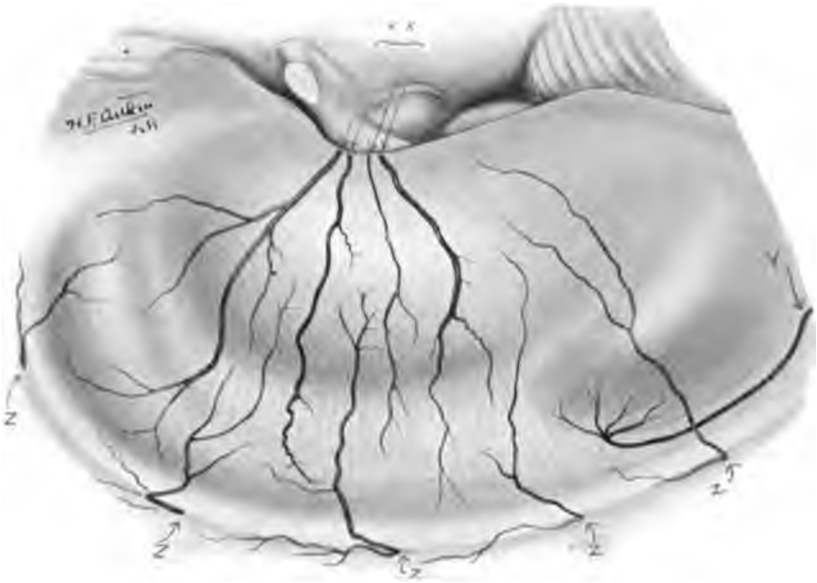


Fig. 24.

Venous circulation. The thalamus, putamen, and nuclei caudati are shown in a conventionalized manner.

x x are of the system shown in Figs. 22 and 23.

y drains the thalamus and joins larger veins posteriorly.

z z z z z drain the nuclei caudati and putamen; they either lie on their surfaces or penetrate them superficially, and upon removal of the capsula externa are generally visible, and at points *z* they can be seen in the walls of the ventriculus lateralis and are tributaries to the vene cerebri magna (Galeni).

In bringing this report to a close, it is perhaps pertinent to state that it is in no way intended as an attack on M. Duret's findings; his lenticulo-optic artery has not been found in either side of 45 brains, and Dr. Heubner, after dissecting 30 brains, does not mention it. M. Duret says, in *Le Progrès Médical*, November 8, 1873, p. 259, that rather than follow each artery through the brain substance to its termination, and in so doing destroy all matter passed through, he preferred making cross cuts and by matching up cut ends of arteries trace them from their beginnings to their terminals.

The use of this method easily leads the dissector to error, as one can readily see that, when tracing branches backward from the a. cerebri media, the dissector could pick up any of the cut ends of branches 21, Fig. 7; or C of Fig. 10, E of Fig. 11, or similar branches, and follow them into the thalamus.

When gathering the material for this report, the vessels were traced from the larger ends to their smaller ends and all parts passed through *were* destroyed; but great numbers of sketches were made of each dissection and many notes were taken.

The greater part of the material had been hardened in formalin before it came into my possession and consequently was dissected without injection.

It is with feelings of sincere gratitude that Dr. J. H. Wright and Dr. Oscar Richardson are thanked for their valuable advice and generous supply of material.

H. F. AITKEN.

MASSACHUSETTS GENERAL HOSPITAL.

I feel that it is unnecessary for me to make any comment upon this report at this time. Mr. Aitken has been gathering the material for over five years, and it contains much that is of value and will require much study to thoroughly digest it.

In parallel columns I give the descriptions of the circulation of this region as Charcot has given it, and as it is given in the foregoing report:

Charcot summed up the knowledge of the time as follows:	Our finding can be summed up thus:
1. Middle Cerebral Artery has predominant share.	1. Middle Cerebral Artery has *not* plainly the predominant share.
It supplies, first, greater part of caudate nucleus; second, all of lenticular nucleus; third, portion of optic thalamus; fourth, whole extent of internal capsule.	It supplies, first, a limited part of caudate nucleus (back of the head); second, middle of lenticular nucleus; third, no part of optic thalamus; fourth, middle part of internal capsule; fifth, external capsule slightly.
2. Anterior Cerebral Artery has unassuming position.	2. Anterior Cerebral Artery. Caliber of vessels equal to middle cerebral artery.
It supplies head of C. N. *not* constantly.	It supplies constantly head of C. N. Supplies principally globus pallidus and anterior third of putamen; anterior part of internal capsule and external capsule slightly.
3. Posterior Cerebral Artery more important than anterior cerebral artery.	3. Posterior Cerebral Artery not more important than anterior cerebral artery.
It supplies O. T. largely, superior layers of crura cerebri and corpora quadrigemina.	It supplies O. T. largely and
"Localization of Cerebral and Spinal Diseases," J. M. Charcot (p. 69). Translated by Walter Baugh Hadden, M.D. London: New Sydenham Society, 1883.	
	4. Choroid Artery from Internal Carotid Artery.
	It supplies posterior third of putamen slightly, globus pallidus and inner part of internal capsule.

Judging from Charcot's preface, he would be pleased to have these results analyzed twenty-five years later.

In 45 examinations no case of lenticulo-optic artery was found, a result radically different from what has been accepted.

J. B. AYER, M.D.,
Boston.

NOTE ON THE ARTERIES OF THE CORPUS STRIATUM.*

BY JAMES B. AYER, M.D., BOSTON,
AND
H. F. AITKEN, BOSTON,
Artist at the Massachusetts General Hospital.

Two years ago while studying the gross appearances of arteriosclerosis in the arteries of the brain, we were impressed with the barren descriptions of, and the lack of available information relating to, the circulation of the corpus striatum.

The plan was then formed to make fresh dissections. These were made and as the result of this work revealed new and interesting material, it was decided to publish an informal report, a part of which is now presented.

The following is a representative textbook description of the circulation of the corpus striatum: The a. cerebri anterior near its base throws off several inconstant branches which go to the caput nuclei caudati; and a group comes from the a. cerebri anterior in the region of, and sometimes from, the a. communicans anterior and pursues a retrograde course to the innermost part of the substantia perforata anterior and thence into the caput nuclei caudati. The a. cerebri media near its base gives off numerous branches, some of which supply the nucleus lentiformis and pass through the capsula interna into the nucleus caudatus, while others supply the thalmus (which also receives blood from the a. cerebri posterior) and one of these is longer than the others and is called by M. Charcot the artery of hemorrhage.

This description has been condensed from the reports of M. Duret in five numbers of *Le Progrès Médical* for 1873 and in the *Archives de Physiologie*, 1874, wherein he published the account of his investigations, though he communicated them to the Société de Biologie on Dec. 7, 1872, "which, by remarkable coincidence, was the same day on which Dr. Heubner of the University of Leipzig published at Berlin an account of the circulation of this region which in all essential points was identical with M. Duret's."

J. M. Charcot, in his "Localization of Cerebral and Spinal Diseases," translated for and published by the New Sydenham Society, London, 1883, has by frequent quotation absorbed the above-mentioned reports of M. Duret to such an extent that one cannot readily separate them; therefore M. Charcot will be referred to with the understanding that all relating to the circulation shall be accredited to M. Duret.

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*These anatomical investigations, which are being conducted by Mr. Aitken, are a prefixed portion of a study on arteriosclerosis.

The published illustrations of the circulation of the corpus striatum are quite misleading. By following M. Duret's first drawing, they have been drawn invariably in cross section, though one can readily see from his description that they should be shown in sagittal section — for although the arteries of the corpus striatum enter the substantia perforata anterior in an order that is about at right angles to the fissura longitudinalis cerebri, those predominating at once bend outward toward the exterior wall of the nucleus lentiformis, and in so doing spread out, some going frontward and some backward, thus forming a " fan," so that their collective position is at right angles to that formed at their entrance of the substantia perforata anterior and parallel to the fissura longitudinalis cerebri.

M. Charcot's method of approach in dissecting out the arteries " consists in removing successively the gray matter of the island of Reil, the subjacent white substance, the claustrum and, lastly, the external capsule. In this manner the external surface of the lenticular nucleus is exposed in its whole extent. By means of this preparation they are seen to be arranged like a fan on the surface of the gray nucleus."

This method was followed in a general way, and it was noticed that these arteries formed themselves into three groups, each supported by one larger artery, there being one artery a little more than 1 mm. in diameter, taking a backward course, one medianward and one frontward; with these are several smaller arteries which grouped themselves in a manner suggesting the slats of the " fan."

These three groups will be referred to as
Group 1, which spreads frontward,
Group 2, medianward, and
Group 3 will be that which runs backward.

The present description will be confined to Group 1.

The arteries thus exposed were presumably from the a. cerebri media and an attempt was made to classify these three divisions and see if there were any precise order in which they were thrown off from the a. cerebri media.

To accomplish this it was necessary to follow each artery to its origin in the a. cerebri media.

Between the substantia perforata anterior and the trunk of the a. cerebri media there is a tangled and confused mesh of pia mater and vessels, and in tracing one of these little arteries through this snarl without losing or breaking it, or destroying any of the adjacent and sometimes adherent vessels, is a tedious and difficult task.

Had M. Duret and M. Charcot traced these vessels to their origins, they would not have written the following:

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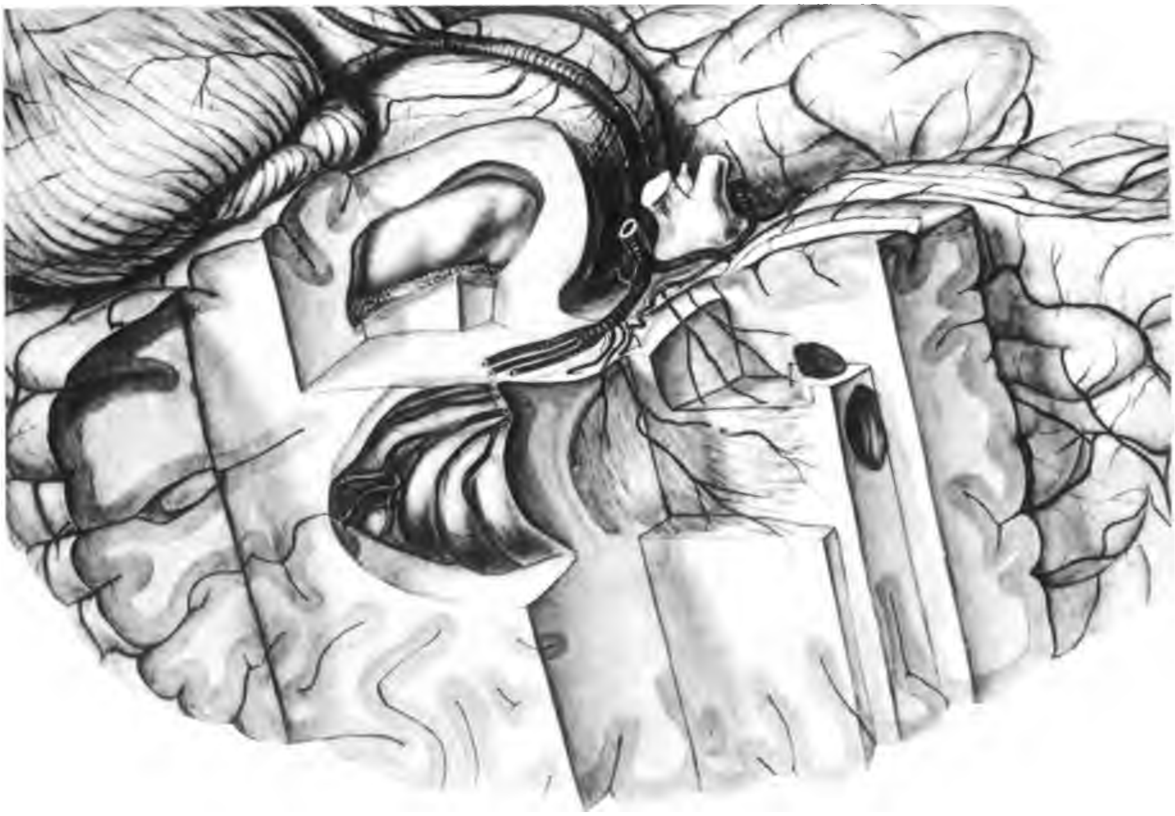

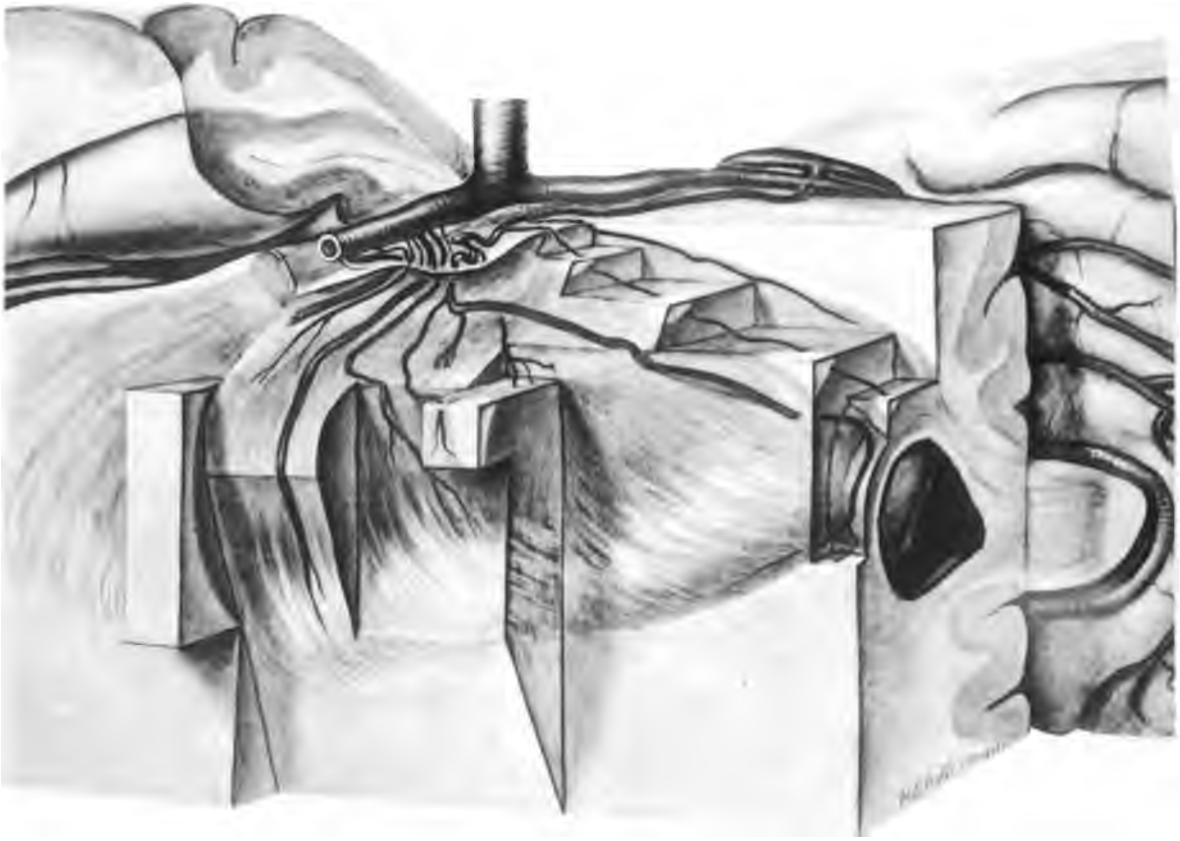

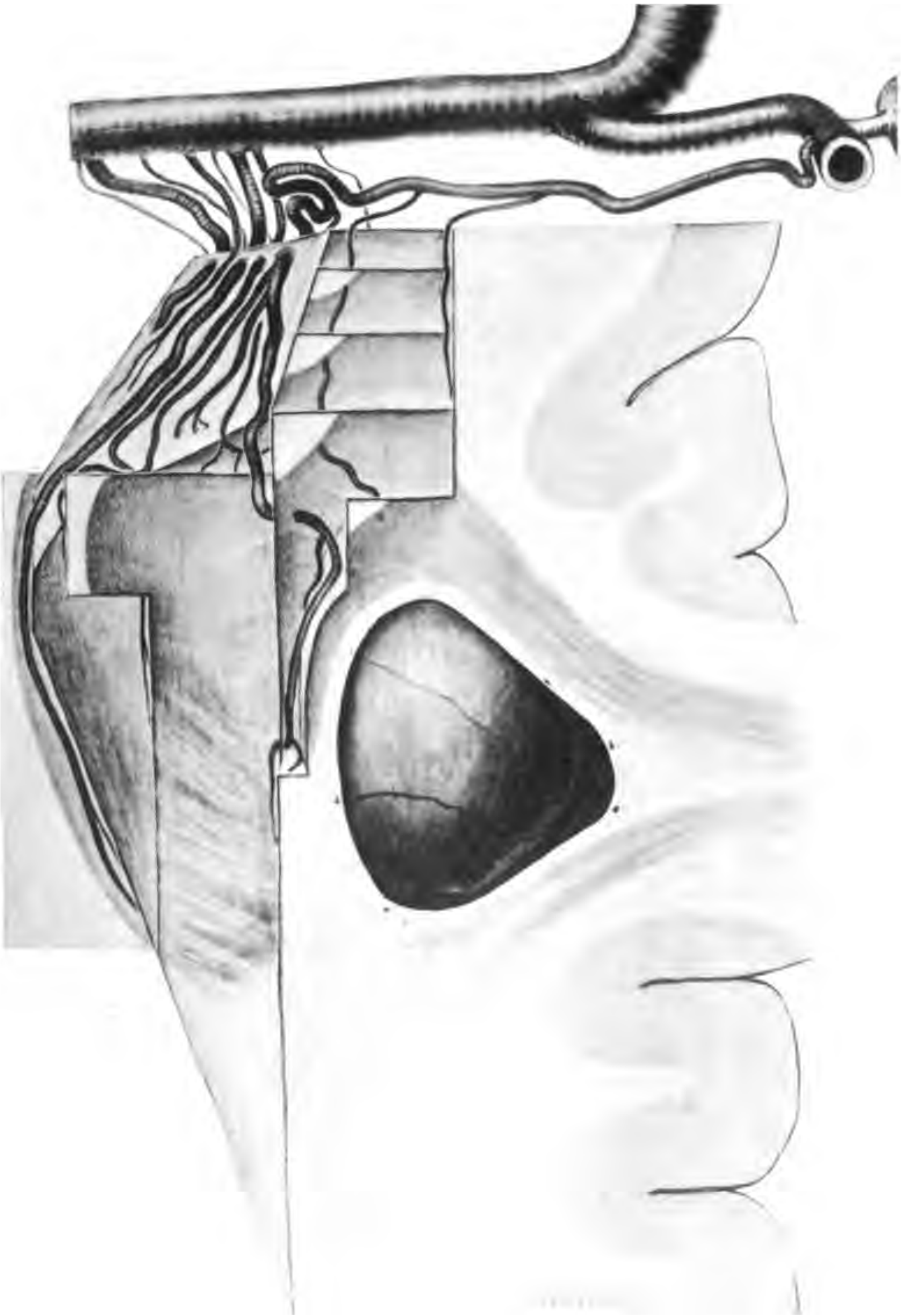

" The predominant share of the circulation of the corpus striatum belongs to the sylvian artery which supplies: (1) the greater part of the caudate nucleus; (2) all of the lenticular nucleus; (3) a portion of the optic thalmus; (4) the whole extent of the internal capsule. The anterior cerebral, on the other hand, has a very unassuming position in this system. It furnishes twigs to the head of the caudate nucleus only and even this distribution is not constant."

This statement regarding the relative importance of these two arteries is repeated throughout the writings of these authors and has been preserved in anatomical textbooks.

While one hesitates to dispute such well-established authorities, the dissection of numerous brains made evident the need of modifying the statement when it was found that Group 1 had its origin in the *a. cerebri anterior.*

S C

The main artery of this group has its course in the a. cerebri anterior, directly opposite the a. communicans anterior. It starts backward on the superior surface of the a. cerebri anterior and is sometimes adherent to it, and is not visible unless the a. cerebri anterior is freed from it and drawn to one side. It can then readily be traced back to the bifurcation of the a. carotis interna where it takes an outward turn and follows the a. cerebri media and enters the tangle of the pia mater and vessels that lie between the a. cerebri media and the substantia perforata anterior.

This artery differs from the other arteries of the corpus striatum by giving off branches before it enters the substantia perforata anterior. As soon as it takes the outward turn at the bifurcation of the a. carotis interna it sends a branch through the substantia perforata anterior into the inferior surface of the nucleus lentiformis, and remaining close to the surface it passes frontward into the lower portion of the caput nuclei caudati. Near this branch the artery gives off a similar branch which takes a parallel course and is a little longer, ending in the nucleus caudatus at its extreme anterior portion. The greater portions of these two branches are in the putamen and supply it with minute branches. The artery, just before it enters the substantia perforata anterior, sends one more branch which spends itself in the putamen.

The artery itself then goes through the substantia perforata anterior into the nucleus lentiformis where it gives out several branches that are more or less confined to the putamen, though sometimes they enter the capsula interna ; it then changes its course to one more anterior, sometimes bifurcating, and continues to the capsula interna through which it passes into the nucleus caudatus to its extreme anterior part. It here breaks up into numerous branches, some of which turn back along the cauda nuclei caudati, while others enter and end in the capsula externa.

This description is founded on the dissection of 25 brains in which the artery was found on both sides in 100% of the cases, though there were a few cases where this artery was not so highly developed as is described above. In such cases the remainder of the circulation was taken up by the a. cerebri media.

There can be little doubt that M. Charcot has described the main trunk of this artery after it has entered the brain, and both he and M. Duret, if they speak of the first three branches, describe them also as coming from the a. cerebri media. M. Charcot says:

" An artery is of special importance from its size and from the pre-eminent part which it plays in the intra-encephalic hemorrhage. We should in a manner be justified in styling it, *the artery of cerebral hemorrhage.*" " After penetrating the lenticular nucleus it gains the substance of the caudate nucleus by crossing the upper part of the internal capsule. It then continues forward and extends to the most anterior part of the caudate nucleus."

The three plates show the bases of the brains in superior positions, necessitated by the requirements of light and shade. They are drawn in a manner that is somewhat diagrammatic. Plate I is about actual size, showing the situations of the insula; the hippocampus; the chiasma opticum; the cornu anterius ventriculi lateralis, etc., in relation to the corpus striatum. Plate II is enlarged one diameter; groups 1 and 2 are easily distinguishable. Plate III is a front view of the same dissection shown in Plate II and is enlarged three diameters above actual size.

We wish to here thank Dr. J. H. Wright for his valuable advice and Dr. Oscar Richardson for generously supplying material which made possible our work in this region.

A Report on the Circulation of the Labor Gazette

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Note on the Arteries of the Corpus Striatum

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